

13.—Notes on the composition and structure of the Duketon Meteorite

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Abstract

The Duketon Meteorite, whose discovery in 1948 was previously reported by the author, is a medium octahedrite in the sense of Lovering and others (1957). Schreibersite, and possibly cohenite, are present, but neither troilite nor lawrencite was observed. Analyses of two samples gave:—Fe (by difference) 91.9, 92.1; Ni 7.36, 7.14; Co 0.51, 0.48; P 0.244, 0.239; S 0.031, 0.029.

A preliminary note on the Duketon Meteorite with a history of the find, a description of the meteorite and photographs has already been published (Frost, 1958).

The Duketon Meteorite was found in 1948 resting on the surface about 10 miles north of Duketon, Western Australia. This is approximately long. 122° 22'E, lat. 27° 30'S giving the seven figure coordinate number (CN) — 1224, — 275. Its original weight was probably about 119 kg. (263 lb.). The surface, contrary to previous opinion, is not weathered and the very dark brown (Munsell 10YR2/2) striated crust is perfectly preserved.

Grinding and etching of a section indicates that the structure is, using the definition of Lovering and others (1957), that of a medium octahedrite. The average width of the kamacite plates, calculated from measurements after determining the orientation of the etched surface with the aid of table I of Belaiew (1923), is 1.0 mm. On the surface studied no troilite was observed but schreibersite, and possibly

cohenite, occur as grains and plates up to 0.02 x 0.3 mm. in cross-section, mainly within the plessite. The plessite is mostly of the fine-grained perthitic variety. There is no evidence of the presence of lawrencite.

TABLE I

Analyses (columns a and b) of two samples of Duketon Meteorite

		a	b	c
Fe	....	91.9	92.1	0.1
Ni	....	7.36	7.14	0.04
Co	....	0.51	0.48	0.01
P	....	0.244	0.239	0.005
S	....	0.031	0.029	0.005

Notes: Analytical results in weight per cent. Iron by difference. Column c: estimated standard error of results for a and b. Analyst: P. R. Hentschel.

Analyses of two fragments from the interior of the meteorite (Table I) indicate no unusual features. These analyses were made possible by a Research Grant from the University of Canterbury.

References

- Belaiew, N. T. (1923).—The inner structure of the crystal grain as revealed by meteorites and Widmanstätten figures. *J. Inst. Met.* 29: 379-406.
- Frost, M. J. (1958).—A preliminary note on the Duketon Meteorite. *J. Roy Soc. W. Aust.* 41: 55-56.
- Lovering, J. F., Nichiporuk, W., Chodus, A. and Brown H. (1957).—The distribution of gallium, germanium, cobalt, chromium and copper in iron and stony-iron meteorites in relation to nickel content and structure. *Geochim. et Cosmoch. Acta* 11: 263-278.

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